REMARKS/ARGUMENTS

Reconsideration and allowance of the subject application are respectfully requested.

The Examiner makes a number of rejections under 35 U.S.C. §112, second paragraph. Claim 4 has been amended to delete the language "in the step of mixing and amplifying," which should eliminate the Examiner's rejection. The Examiner objects to the use of the term "side-bands" in claim 9 contending that it lacks antecedent basis. Applicants are not referring back to any previously defined side-bands in claim 8 or claim 1. Instead, claim 9 introduces side-bands associated with the switched radio frequency signal for the first time. Consequently, it is believed that the antecedent basis objection should be withdrawn. Claim 11 is canceled rendering its objection moot. It is uncertain why the Examiner rejected claims 12 and 13, which do not depend from claim 11. Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. §112, second paragraph be withdrawn.

Claims 1-4, 6-16, and 18 stand rejected under 35 U.S.C. §102 as being anticipated by previously-applied Hellberg et al (WO 98/11683). This rejection is respectfully traversed.

To establish that a claim is anticipated, the Examiner must point out where each and every limitation in the claim is found in a single prior art reference. *Scripps Clinic & Research Found. v. Genentec, Inc.*, 927 F.2d 1565 (Fed. Cir. 1991). Every limitation contained in the claims must be present in the reference, and if even one limitation is missing from the reference, then it does not anticipate the claim. *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565 (Fed. Cir. 1986). Hellberg fails to satisfy this rigorous standard.

Hellberg discloses generating a moderately wideband, high power RF signal with high efficiency and linearity. As shown in Figures 4 and 5, a sigma-delta modulator 410 generates a two-level, digital control signal from an information signal followed by digital up-mixing 421,

switching 423, and bandpath filtering 430. The switching process provides amplification via DC power supplies +U and -U, and the digitally up-mixed, sigma-delta coded baseband signal determines which switch is closed. As shown in Figure 5 at block 422, when the RF signal equals a logical "1", the RF signal is routed to the E/O block 5310 which generates an optical signal O_1 that energizes a first photoconductive switch 5330 connected to the positive, DC power supply voltage +U. Alternatively, if the RF signal is a logical "0", a laser 5320 is activated to energize with optical signal O_2 a second photoconductive switch 5340 which is connected to the negative DC power supply voltage –U.

> When the first photoconductive switch 5330 is irradiated with light o_1, its supply voltage +U will be available on said output, whereas when the second photoconductive switch 5340 is a irradiated with light o_2 the supply voltage –U of the switch will be available on the output instead.

Page 14, lines 12-15. Thus, the voltage-switched information signal P output from the switching unit is one of four different, constant DC voltages: +3U, +U, –U, or -3U. This can be seen in Figure 9c.

One drawback with Hellberg's system is that the photoconductive switches are not ideal switches, and therefore, achieve an efficiency less than 100 percent. Such switches also have finite transition times between closed and open states which results in a switching transient problem. In addition, if two switches are simultaneously closed during a switching transient, an almost short-circuited DC power supply would result. Alternatively, if all switches are simultaneously open during a switching transient, the band-pass filter will create a voltage transient which also has negative results. Although transient problems could be reduced by using a faster switch, there is a tradeoff between switching speed, switching conductivity, and required switch control signal power. The present invention ***solves the problem of switching***

transients by connecting alternating carrier voltage--instead of connecting DC voltages as in Hellberg et al.

Switching events are timed to coincide with the regular time intervals when the AC carrier voltages have a zero voltage value, (or close to zero), to solve the switching transient problem. In this regard, the Examiner's attention is directed to Figures 2 and 3 of the present application, which show that digital signal S_D is coupled through switches S_1- S_M to control switching-in different carrier signals represented as $v_C(t)$. Figure 4 of the present application illustrates a zero crossing of the AC carrier $v_C(t)$ (in Figure 4d) which occurs when both switches SW1 and SW2 are closed. This also true for the ***modified*** AC carrier signal shown in Figure 4e. By having the switches SW1 and SW2 closed at the same time for a small time period, the switching transient problem is solved since the carrier signal is zero at that switching time.

Accordingly, Hellberg fails to disclose in method claim 1 "generating for each of the discrete signal values a corresponding alternating current (AC) carrier signal." Hellberg's code sequence generator 511 in the mixer block 421 of Figure 5 generates a code sequence B which is input to an exclusive-or mixer together with the information signal to form a radio frequency (RF) **control** signal at the output. That bit sequence B is a sequence of zeros and ones and is used to generate the digital control signal fed to the photoswitches coupled to the DC power supplies +U and –U The claimed AC carrier signals are not switch control signals, which is what the RF signal is in Hellberg. Hellberg clearly describes that the switches are controlled by the digital control signal generated using signal B and labeled RF in Figure 5. See page 4, line 19-page 5, line 2, and page 5, line 25-page 6, line 12, in which the expression "switch-unique supply voltage" refers to the DC-voltages connected to each switch.

No where in Fig. 5 and on page 12, lines 15-18 to which the Examiner refers does Hellberg disclose that the photoswitches are connected to alternating current carrier signals. Instead, the switches are connected to direct current (DC) voltages +U and -U. An alternating current (AC) carrier signal describes a signal with alternating and equal positive and negative voltages or current waveforms. An arbitrary bit sequence that may, for example, have several "0's" in a row or several "1's" in a row would not be understood by a person of ordinary skill in the art as an alternating current (AC) carrier signal. Similarly, independent claim 14 recites "multiple alternating current (AC) carrier signal generators, one individual AC carrier signal generator provided for and associated with each of the at least two signal values." Hellberg only discloses one code sequence generator. The code sequence B is **not** an AC carrier signal.

Hellberg also fails to disclose using each digital signal value to control connecting the corresponding AC carrier signal to the output line. As explained on page 14 of Hellberg, beginning at line 12:

> when the photoconductive switch 5330 is irradiated with light o_1, its supply voltage +U will be available on said output, whereas when the second photoconductive switch 5340 is irradiated with light o_2 the supply voltage –U of the switch will be available on the output instead.

Thus, Hellberg's switch outputs a DC voltage and does not connect a corresponding AC carrier signal to the output. Independent claim 14 recites:

> wherein each of the switches is associated with and controlled by one of the digital signal values to connect the AC carrier signal generator associated with the signal value to the output line when the digital signal adopts the respective signal value and to disconnect the AC carrier signal value when the digital signal does not adopt the respective signal value.

Hellberg's switches 5330 and 5340 do not connect an AC carrier signal generator to the output P.

Accordingly, Hellberg fails to disclose all of the features recited in the claims.

The application is now in condition for allowance. An early notice to that effect deserves this earnestly solicited.

Respectfully submitted,

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